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1 [Color gamut transform pairs](#)

Alvy Ray Smith

 August 1978 **ACM SIGGRAPH Computer Graphics , Proceedings of the 5th annual conference on Computer graphics and interactive techniques**, Volume 12 Issue 3

 Full text available: [pdf\(2.10 MB\)](#)

 Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

Digital control of color television monitors—in particular, via frame buffers—has added precise control of a large subset of human colorspace to the capabilities of computer graphics. This subset is the gamut of colors spanned by the red, green, and blue (RGB) electron guns exciting their respective phosphors. It is called the RGB monitor gamut. Full-blown color theory is a quite complex subject involving physics, psychology, and physiology, but restrictio ...

Keywords: Brightness, Color, Color transform, Gamut, Hue, Luminance, NTSC, Saturation, Value

2 [An analysis of selected computer interchange color spaces](#)

James M. Kasson, Wil Plouffe

 October 1992 **ACM Transactions on Graphics (TOG)**, Volume 11 Issue 4

 Full text available: [pdf\(6.77 MB\)](#)

 Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)


Important standards for device-independent color allow many different color encodings. This freedom obliges users of these standards to choose the color space in which to represent their data. A device-independent interchange color space must exhibit an exact mapping to a colorimetric color representation, ability to encode all visible colors, compact representation for given accuracy, and low computational cost for transforms to and from device-dependent spaces. The performance of CIE 1931 ...

Keywords: CIE 1931 XYZ, CIELAB, CIELUV, SMPTE-C RGB, YCbCr, YES, color, color models, color spaces, device-independent color, quantization

3 [Lossless compression of computer generated animation frames](#)

Hee Cheol Yun, Brian K. Guenter, Russell M. Mersereau

 October 1997 **ACM Transactions on Graphics (TOG)**, Volume 16 Issue 4

Full text available:  pdf(5.16 MB)Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#), [review](#)

This article presents a new lossless compression algorithm for computer animation image sequences. The algorithm uses transformation information available in the animation script and floating point depth and object number information at each pixel to perform highly accurate motion prediction with vary low computation. The geometric data (i.e., the depth and object number) can either be computed during the original rendering process and stored with the image or computed on the fly during com ...

Keywords: compression, computer animation, computer graphics, motion prediction

4 [A powerful strategy for deriving efficient programs by transformation](#)

Alberto Pettorossi

August 1984 **Proceedings of the 1984 ACM Symposium on LISP and functional programming**


Full text available:  pdf(691.69 KB)Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

We present a method for deriving efficient iterative programs by transformation from recursive equation specifications. It consists of two phases: i) the transformation of general recursive programs into linear recursive ones, and ii) the transformation of linear recursive programs into iterative ones. In the first phase we apply the "tupling strategy" studied in [BUD77, Pet77], and implicitly used by other authors in the area of program transformation. That strategy ...

5 [Efficient compilation of linear recursive functions into object level loops](#)

Peter Harrison, Hessam Khoshnevisan

July 1986 **ACM SIGPLAN Notices , Proceedings of the 1986 SIGPLAN symposium on Compiler construction**, Volume 21 Issue 7


Full text available:  pdf(1.22 MB)Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

Whilst widely recognised as an excellent means for solving problems and for designing software, functional programming languages have suffered from their inefficient implementations on conventional computers. A route to improved runtime performance is to transform recursively defined functions into programs which execute more quickly and/or consume less space. We derive equivalent imperative programming language loops for a large class of linear recursive functions of which the tail-recursi ...

6 [Linear combination of transformations](#)

Marc Alexa

July 2002 **ACM Transactions on Graphics (TOG) , Proceedings of the 29th annual conference on Computer graphics and interactive techniques**, Volume 21 Issue 3

Full text available:  pdf(2.95 MB)Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

Geometric transformations are most commonly represented as square matrices in computer graphics. Following simple geometric arguments we derive a natural and geometrically meaningful definition of scalar multiples and a commutative addition of transformations based on the matrix representation, given that the matrices have no negative real eigenvalues. Together, these operations allow the linear combination of transformations. This provides the ability to create weighted combination of transform ...

Keywords: exponential map, linear space, logarithm, matrix exponential, transformations

7 Poster Session: OoLaLa: how and when can it be optimised?

Mikel Luján, T. L. Freeman, John R. Gurd

November 2002 **Proceedings of the 2002 joint ACM-ISCOPE conference on Java Grande**

Full text available:  pdf(113.40 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)


OoLaLa is an object oriented linear algebra library designed to reduce development and maintenance effort [2]. In contrast with traditional (Fortran-based) libraries, it provides two high abstraction levels that significantly reduce the combinatorial number of implementations necessary for particular linear algebra operations. Traditional libraries sacrifice abstraction for performance and their implementations of matrix operations have embedded knowledge about the data structures, s ...

Keywords: *Java, numerical linear algebra, object-oriented programming, optimization*

8 Linear analysis and optimization of stream programs

Andrew A. Lamb, William Thies, Saman Amarasinghe

May 2003 **ACM SIGPLAN Notices , Proceedings of the ACM SIGPLAN 2003 conference on Programming language design and implementation**, Volume 38 Issue 5

Full text available:  pdf(469.80 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

As more complex DSP algorithms are realized in practice, there is an increasing need for high-level stream abstractions that can be compiled without sacrificing efficiency. Toward this end, we present a set of aggressive optimizations that target linear sections of a stream program. Our input language is StreamIt, which represents programs as a hierarchical graph of autonomous filters. A filter is linear if each of its outputs can be represented as an affine combination of its inputs. Linearity ...

Keywords: DSP, FFT, StreamIt, algebraic simplification, embedded, linear systems, optimization, stream programming

9 Transformations for imperfectly nested loops

Induprakas Kodukula, Keshav Pingali

November 1996 **Proceedings of the 1996 ACM/IEEE conference on Supercomputing (CDROM)**

Full text available:  pdf(299.01 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

Loop transformations are critical for compiling high-performance code for modern computers. Existing work has focused on transformations for perfectly nested loops (that is, loops in which all assignment statements are contained within the innermost loop of a loop nest). In practice, most loop nests, such as those in matrix factorization codes, are imperfectly nested. In some programs, imperfectly nested loops can be transformed into perfectly nested loops by loop distribution, but this is ...

10 A Bidirectional Simplex Algorithm

A. Orden, V. Nalbandian

April 1968 **Journal of the ACM (JACM)**, Volume 15 Issue 2

Full text available:  pdf(749.48 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

A simplex type algorithm is presented which deals uniformly with (a) ordinary linear programming problems, (b) problems with upper bounded variables, and (c) problems with convex piecewise linear objective functions, e.g., absolute value terms. Problems of types (b) and (c) can be solved by suitable transformations into ordinary linear programming

forms, but are handled by the unified algorithm without such transformations. Comparative computer runs indicate that direct solution by the unif ...

11 Smarter control variables: regression-adjusted linear and nonlinear controls

Peter A. W. Lewis, Richard Ressler, R. Kevin Wood

December 1987 **Proceedings of the 19th conference on Winter simulation**


Full text available:  pdf(439.53 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

Nonlinear regression-adjusted control variables are investigated for improving variance reduction in statistical and system simulations. Simple control variables are transformed using linear and nonlinear transformations, and parameters of these transformations are selected using linear or nonlinear least squares regression. As an example, piecewise powertransformed variables are used in the estimation of the mean for the two variable Anderson-Darling goodness-of-fit statistic W

12 Cache miss equations: a compiler framework for analyzing and tuning memory behavior

Somnath Ghosh, Margaret Martonosi, Sharad Malik

July 1999 **ACM Transactions on Programming Languages and Systems (TOPLAS)**, Volume 21 Issue 4

Full text available:  pdf(548.19 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#), [review](#)


With the ever-widening performance gap between processors and main memory, cache memory, which is used to bridge this gap, is becoming more and more significant. Caches work well for programs that exhibit sufficient locality. Other programs, however, have reference patterns that fail to exploit the cache, thereby suffering heavily from high memory latency. In order to get high cache efficiency and achieve good program performance, efficient memory accessing behavior is necessary. In fact, f ...

Keywords: cache memories, compilation, optimization, program transformation

13 From control effects to typed continuation passing

Hayo Thielecke

January 2003 **ACM SIGPLAN Notices , Proceedings of the 30th ACM SIGPLAN-SIGACT symposium on Principles of programming languages**, Volume 38 Issue 1

Full text available:  pdf(194.95 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

First-class continuations are a powerful computational effect, allowing the programmer to express any form of jumping. Types and effect systems can be used to reason about continuations, both in the source language and in the target language of the continuation-passing transform. In this paper, we establish the connection between an effect system for first-class continuations and typed versions of continuation-passing style. A region in the effect system determines a local answer type for contin ...

Keywords: continuations, control effects, polymorphism, type and effect systems

14 Fourier transform communication system

J. Salz, S. B. Weinstein

October 1969 **Proceedings of the first ACM symposium on Problems in the optimization of data communications systems**

Full text available:  pdf(675.23 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

The development of rapid algorithms for computation of the discrete Fourier transform has encouraged the use of this transform in the design of communication systems. Here we

describe and analyze a data transmission system in which the transmitted signal is the Fourier transform of the original data sequence and the demodulator is a discrete Fourier transformer. This system is a realization of the frequency division multiplexing strategy known as "parallel data transmission", an ...

15 Tridiagonalization by permutations

Norman E. Gibbs, William G. Poole

January 1974 **Communications of the ACM**, Volume 17 Issue 1

Full text available:  [pdf\(439.97 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

Tridiagonalizing a matrix by similarity transformations is an important computational tool in numerical linear algebra. Consider the class of sparse matrices which can be tridiagonalized using only row and corresponding column permutations. The advantages of using such a transformation include the absence of round-off errors and improved computation time when compared with standard transformations. A graph-theoretic algorithm which examines an arbitrary $n \times n$...

Keywords: algorithm, bandwidth, eigenvalues, graph, permutation, sparse matrix, tridiagonal matrix

16 On randomly interleaved memories

Ram Raghavan, John P. Hayes

November 1990 **Proceedings of the 1990 ACM/IEEE conference on Supercomputing**


Full text available:  [pdf\(982.64 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#)

Memory address interleaving, where an address k generated by a processor is mapped into the memory bank $k \pmod{m}$, is a basic technique for increasing memory bandwidth. However, the access conflicts that can occur in interleaved memories sometimes reduce the bandwidth gain significantly, especially in vector processors. Recently, a few random interleaving schemes have been proposed to reduce memory contention. We define a class of such methods, called **LINEAR**, ...

17 Partitioning the statement per iteration space using non-singular matrices

Eduard Ayguadé, Jordi Torres

August 1993 **Proceedings of the 7th international conference on Supercomputing**

Full text available:  [pdf\(748.15 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

In this paper we generalize the framework of linear loop transformations: we consider loop alignment as a new component in the transformation process. The aim is to exploit the additional inherent statement-level parallelism and reduce the amount of interprocessor synchronization and communication when a coarse-grain MIMD execution model is considered. The transformation process is modelled with non-singular matrices and we use the ideas recently proposed in this field to generate an effici ...

18 Symbolic solution polynomial equation systems with symmetry

K. Gatemann

July 1990 **Proceedings of the international symposium on Symbolic and algebraic computation**

Additional Information: [full citation](#), [abstract](#), [citations](#), [index terms](#)

Systems of polynomial equations often have symmetry. The Buchberger algorithm which may be used for the solution ignores this symmetry. It is restricted to moderate problems unless factorizing polynomials are found leading to several smaller systems. Therefore two methods are presented which use the symmetry to find factorizing polynomials, decompose

the ideal and thus decrease the complexity of the system a lot. In a first approach projections determine factorizing polynomials a ...

19 Special issue on independent components analysis: Blind separation of post-nonlinear mixtures using linearizing transformations and temporal decorrelation


Andreas Ziehe, Motoaki Kawanabe, Stefan Harmeling, Klaus-Robert Müller
December 2003 **The Journal of Machine Learning Research**, Volume 4

Full text available:  pdf(3.39 MB) Additional Information: [full citation](#), [abstract](#), [index terms](#)

We propose two methods that reduce the post-nonlinear blind source separation problem (PNL-BSS) to a linear BSS problem. The first method is based on the concept of *maximal correlation*: we apply the alternating conditional expectation (ACE) algorithm---a powerful technique from non-parametric statistics---to approximately invert the componentwise non-linear functions. The second method is a Gaussianizing transformation, which is motivated by the fact that linearly mixed signals bef ...

20 Polynomial-time approximation schemes for geometric min-sum median clustering

Rafail Ostrovsky, Yuval Rabani
March 2002 **Journal of the ACM (JACM)**, Volume 49 Issue 2

Full text available:  pdf(257.54 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)





The Johnson--Lindenstrauss lemma states that n points in a high-dimensional Hilbert space can be embedded with small distortion of the distances into an $O(\log n)$ dimensional space by applying a random linear transformation. We show that similar (though weaker) properties hold for certain random linear transformations over the Hamming cube. We use these transformations to solve NP-hard clustering problems in the cube as well as in geometric settings. More specifically, ...

Keywords: Clustering, high-dimensional data, polynomial-time approximation schemes

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